

GOOGLE COLAB:

CODE:

```
# Mount Google Drive to access the dataset
from google.colab import drive
drive.mount('/content/drive')
# Install necessary libraries
!pip install tensorflow
# Import libraries
import os
import numpy as np
import tensorflow as tf
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense
from tensorflow.keras.models import Sequential
# Define paths to the dataset
base_dir = '/content/drive/MyDrive/Colab Notebooks/diabetic_retinopathy'
train_dir = os.path.join(base_dir, 'train')
validation_dir = os.path.join(base_dir, 'validation')
# Preprocess and augment data
train_datagen = ImageDataGenerator(
    rescale=1./255,
    rotation_range=40,
    width_shift_range=0.2,
    height_shift_range=0.2,
    shear_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    fill_mode='nearest'
)
validation_datagen = ImageDataGenerator(rescale=1./255)
train_generator = train_datagen.flow_from_directory(
    train_dir,
    target_size=(150, 150),
    batch_size=20,
    class_mode='binary'
)
validation_generator = validation_datagen.flow_from_directory(
    validation_dir,
    target_size=(150, 150),
    batch_size=20,
```

```

class_mode='binary'
)
# Define the CNN model
model = Sequential([
    Conv2D(32, (3, 3), activation='relu', input_shape=(150, 150, 3)),
    MaxPooling2D(2, 2),
    Conv2D(64, (3, 3), activation='relu'),
    MaxPooling2D(2, 2),
    Conv2D(128, (3, 3), activation='relu'),
    MaxPooling2D(2, 2),
    Conv2D(128, (3, 3), activation='relu'),
    MaxPooling2D(2, 2),
    Flatten(),
    Dense(512, activation='relu'),
    Dense(1, activation='sigmoid')
])
# Compile the model
model.compile(loss='binary_crossentropy',
              optimizer=tf.keras.optimizers.RMSprop(lr=1e-4),
              metrics=['accuracy'])
# Train the model
history = model.fit(
    train_generator,
    steps_per_epoch=100,
    epochs=20,
    validation_data=validation_generator,
    validation_steps=50
)
# Save the model
model.save('/content/drive/MyDrive/Colab
Notebooks/diabetic_retinopathy/diabetic_retinopathy_model.h5')

```

OUTPUT

```
Found 2000 images belonging to 2 classes. Found 800 images belonging
to 2 classes. Epoch 1/20 100/100 [=====] -
35s 350ms/step - loss: 0.6932 - accuracy: 0.5010 - val_loss: 0.6932 -
val_accuracy: 0.5000 Epoch 2/20 100/100
[=====] - 33s 334ms/step - loss: 0.6932 -
accuracy: 0.5015 - val_loss: 0.6932 - val_accuracy: 0.5000 ... Epoch
20/20 100/100 [=====] - 35s 349ms/step -
loss: 0.6932 - accuracy: 0.4995 - val_loss: 0.6932 - val_accuracy:
0.5000
```